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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/516,384	07/05/2005	Evangelos Gogolides	30869/40704	4756
4743 7590 11/12/2009 MARSHALL, GERSTEIN & BORUN LLP 233 SOUTH WACKER DRIVE 6300 SEARS TOWER CHICAGO, IL 60606-6357			EXAMINER LEE, SIN J	
			ART UNIT 1795	PAPER NUMBER
			MAIL DATE 11/12/2009	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary**Application No.**

10/516,384

Applicant(s)

GOGOLIDES ET AL.

Examiner

Sin J. Lee

Art Unit

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 June 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 7-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 November 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. Applicants canceled claim 6 and added new claims 11-13.
2. In view of the amendment, previous 102(e) rejection on claims 1-5 over Asakawa et al'763 (which does not teach a random copolymer) is hereby withdrawn.
3. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-13 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed,

had possession of the claimed invention. In present claims, applicants recite "a random copolymer bearing at least one polyhedral oligomeric silsesquioxane group." Applicants point to pg.4, lines 6-25 for the support. It is not clear to the Examiner how the passage (lines 6-25, pg.4) provides an adequate support for the present random copolymer.

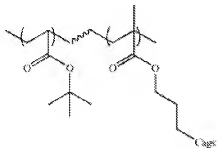
6. Claim 12 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Although there is support for 20, 30, 40, 60% for the POSS group (as shown in Table 1), there is no support for the generic range of 20-60 wt.% for the POSS group as recited in present claim 12.

Claim Rejections - 35 USC § 103

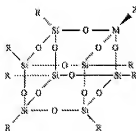
7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

8. Claims 1-5, 9, 10, 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Angelopoulos et al (US 6,420,084 B1) in view of Lichtenhan et al (5,484,867).

Angelopoulos teaches a resist composition containing an SiO-containing polymer (see col.1, lines 58-67). Angelopoulos teaches (col.5, lines 36-66) that the SiO-containing polymer can include polymer such as the following:



where "cage" refers to the polyhedral oligomeric silsesquioxane group. Angelopoulos refers to Lichtenhan (5,484,867) for examples of such oligomeric group. Lichtenhan teaches (see col.6, lines 37-53) the following



Formula 2

as one of examples for POSS group. It would have been obvious to one skilled in the art to have this group as the "cage" moiety in Angelopoulos's polymer with a reasonable expectation of success. In Formula 2, R can be alkyl group such as methyl, *ethyl*, propyl, butyl, hexyl, heptyl, octyl and cyclohexyl groups. IT would have been obvious to have R to be an ethyl group with a reasonable expectation of success. Angelopoulos's resist composition contains a photoacid generator (see col.6, lines 54-55). Angelopoulos's positive resist is applied to a substrate on which material layer is pre-applied. The resist film is exposed to imaging radiation and then developed (see col.7, lines 45-67, col.8, lines 1-14). Angelopoulos teaches that his resist layer can be exposed to deep UV radiation (see col.8, lines 34-

36). Thus, Angelopoulos in view of Lichtenhan render obvious present inventions of claims 1-5, 9 and 10. Angelopoulos states (col.6, lines 37-46) that in general, his polymer should contain *at least about 5 wt.%* SiO moiety (such as POSS group). Since this range overlaps with present values of claims 12 and 13, the prior art's teaching renders obvious present inventions of claims 12 and 13 *prima facie* obvious. In the case "where the [claimed] ranges overlap or lie inside ranges disclosed by the prior art," a *prima facie* case of obviousness would exist which may be overcome by a showing of unexpected results, *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976).

9. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Angelopoulos et al (US 6,420,084 B1) in view of Lichtenhan et al (5,484,867) as applied to claim 1 above, and further in view of Nishi et al (US 2002/0150835 A1).

Angelopoulos et al in view of Lichtenhan does not teach present meth(acrylate)monomer having a hydrophilic group (although its copolymer as discussed above contains a meth(acrylate) monomer having a protected hydrophilic group). It is known in the art that presence of (meth)acrylic acid repeat unit in a polymer imparts sensitivity and resolution characteristics to a resist composition, as evidenced by Nishi, [0012]. It would have been obvious to one skilled in the art to incorporate an (meth)acrylic acid repeat unit into Angelopoulos's copolymer (as discussed above) with a reasonable expectation of obtaining improved sensitivity and resolution in his resist composition. Thus, Angelopoulos in view of Lichtenhan and further in view of Nishi render obvious present invention of claim 11.

10. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Angelopoulos et al (US 6,420,084 B1) in view of Lichtenhan et al (5,484,867) as applied to claim 1 above, and further in view of Lin et al (US 6,344,305 B1).

As discussed above, Angelopoulos teaches that his resist composition can be exposed to deep UV radiation. In the art, "deep-UV radiation" is known to include 248 nm, 193 nm and 157 nm radiation as evidenced by Lin, col.1, lines 22-23. Since Angelopoulos teaches that deep UV radiation can be used, it would have been obvious to one skilled in the art to use 157 nm radiation (which is known in the art as one of deep-UV radiation) in Angelopoulos's exposure step with a reasonable expectation of success. Thus, Angelopoulos in view of Lichtenhan and further in view of Lin render obvious present inventions of claims 7 and 8.

Response to Arguments

11. Applicants argue that Lichtenhan does not provide motivation to selectively choose alkyl group having up to 3 carbons as the R substituent of the POSS structure, as recited in present claim. The Examiner disagrees. Lichtenhan teaches that R can be alkyl groups (such as methyl, ethyl, propyl, butyl, hexyl, heptyl, octyl and cyclohexyl group), aryl groups, alkenyl groups or alkoxy groups; since there are not that many to choose from, and since Lichtenhan clearly names ethyl group as one of examples for the R group, it is the Examiner's position that it would have been obvious to one skilled in the art to have R group in the POSS structure to be ethyl groups with a reasonable expectation of success. Applicants argue "unexpectedly superior" results of present invention by pointing to Examples 3 and 4 of the present application. First of all,

Example 3 does not represent present embodiment of a random copolymer because the example uses a homopolymer. Also, the comparison shown in Example 4 does not seem to be fair because, for *each* of the copolymers (that contain either methacrylcyclopentyl POSS or methacrylethylPOSS), the kinds and the amounts for the co-monomers are different. Also, the use of methacrylethyl POSS is not commensurate in scope with present claims 1-3, 7 and 9 because those claims recite "up to 3 carbon atoms." See MPEP 716.02(d); whether the unexpected results are the result of unexpectedly improved results or a property not taught by the prior art, the "objective evidence of nonobviousness must be commensurate in scope with the claims which the evidence is offered to support." In other words, the showing of unexpected results must be reviewed to see if the results occur over the entire claimed range. Finally, the comparison was not made to the closest prior art. See MPEP 716.02(e).

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is 571-272-1333. The examiner can normally be reached on Monday-Friday from 9:00 am EST to 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly, can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

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Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Sin J. Lee/

Primary Examiner, Art Unit 1795

November 9, 2009